SOUTH DAKOTA STATEWIDE FISHERIES SURVEY
Cavour Lake, Beadle County
2102-F-21-R-48
2015

Figure 1. Cavour Lake, Beadle County

Legal Description: T111N- R60W-Sec. 20-22
Location from nearest town: 2-1/2 miles north of Cavour, SD

Surface Area: 392 acres
Meandered (Y/N): yes
OHWM elevation: none set
Outlet elevation: none set
Max. depth at outlet elevation: 14 feet
Observed water level: not recorded
Contour map available (Y/N): no

Watershed area: 12.7 square miles
Shoreline length: no data
Date set: NA
Date set: NA
Mean depth at outlet elevation: 4 feet
Lake volume: no data
Date mapped: NA

DENR beneficial use classifications: (6) warmwater marginal fish life propagation, (7) immersion recreation, (8) limited-contact recreation and (9) fish and wildlife propagation and stock watering.

Introduction

General

It is believed that Italian railroad laborers working in the area named Cavour Lake for Count Cavour, an Italian statesman and father of Italian railroads.

Ownership of Lake and Adjacent Lakeshore Properties

Cavour Lake is listed as meandered public water in the State of South Dakota Listing of Meandered Lakes. The South Dakota Department of Game, Fish and Parks (GFP) manages the fishery. GFP also owns and manages a Lake Access Area on the southeast corner of the lake and Game Production Areas on the north and south sides.

Fishing Access

The Cavour Lake Access Area on the southeast corner of the lake contains a brand new single lane, concrete plank boat ramp and several areas suitable for shore fishing. The north side of the lake also contains several good shore fishing spots.

Water Quality and Aquatic Vegetation

Water inputs come from a relatively small local watershed and the outlet empties into Pearl Creek and eventually the James River.

The water temperature during this year's lake survey was 26^{o}C (79^{o}F) and the water clarity was poor at 33 cm (13 in) (Table 1). No aquatic vegetation was observed in 2015.

Table 1. Water temperature, Secchi depth and observations/comments on water quality and aquatic vegetation in Cavour Lake, Beadle County, 2006-2015.

Year	*Water Temp ^{o}C (^{o}F)*	*Secchi Depth cm (in)*	*Observations/Comments (algae, aquatic vegetation, water quality, etc.)*
2015	26 (79)	33 (13)	No aquatic vegetation
2014	26 (78)	61 (24)	No observations were recorded
2013	23 (74)	69 (27)	No aquatic vegetation
2011	27 (80)	86 (34)	Sago pondweed
2010	26 (78)	46 (18)	Green water from algae
2008	23 (74)	100 (39)	No observations were recorded
2006	-- (--)	20 (8)	No vegetation, water was stained brown and turbid

Fish Community

Cavour Lake has a fish community typical of many eastern South Dakota waters (Table 2). Black crappies seem to do particularly well in the lake.

Table 2. Fish species commonly found in Cavour Lake, Beadle County.

Game Species	***Other Species***
Walleye	Common Carp
Black Crappie	White Sucker
Yellow Perch	
Northern Pike	
Black Bullhead	
Yellow Bullhead	

Fish Management

Cavour Lake does not have a lot of fish kills and when there are, they are seldom severe enough to eliminate fishing opportunity (Table 3). The lake is actively managed for walleyes and frequent stocking is needed to maintain the population (Table 4). The black crappie population is self-sustaining by natural reproduction and occasional large year classes provide good fishing opportunity.

Table 3. Fish kill history for Cavour Lake, Beadle County.

Year	***Severity***	***Comments***
2007	Moderate	Winterkill (100's of dead carp, dozens of dead crappies, one walleye)
2001	Light	Winterkill of carp and bullheads
1998	Light	Winterkill of crappies, perch and largemouth bass

Table 4. Stocking history for Cavour Lake, Beadle County, 2006-2015.

Year	***Number***	***Species***	***Size***
2007	23,180	Walleye	Small Fingerling
2011	23,340	Walleye	Small Fingerling
2012	46,400	Walleye	Small Fingerling
2014	115,000	Walleye	Fry
2015	27,920	Walleye	Small Fingerling

Methods

Cavour Lake was sampled on August 5-6, 2015 with three overnight gill nets and five overnight trap nets. The gill nets are 45.7 m long x 1.8 m deep (150 ft long x 6 ft deep) with one 7.6 m (25 ft) panel each of 13, 19, 25, 32, 38 and 51-mm-bar-mesh (½, ¾, 1, 1¼, 1½, and 2 in) monofilament netting. The trap nets are constructed with 19-mm-bar-mesh (¾ in) netting, 0.9 m high x 1.5 m wide (3 ft high x 5 ft wide) frames and 18.3 m (60 ft) long leads.

Results and Discussion

Net Catch Results

Black bullheads and common carp were the two most common species present in the gill net sample (Table 5). However, a respectable number of walleye were caught, many reaching sizes desired by anglers (Table 6).

The trap nets also contained a large number of black bullheads (Table 7), along with a modest number of black crappies.

Black bullheads dominated the gill net and trap net catches this year (Table 5) but some were large enough to interest anglers (Table 6). The abundance of game fish species was generally low.

Table 5. Total catch from three overnight gill nets set in Cavour Lake, Beadle County, August 5-6, 2015.

Species	*#*	*%*	*CPUE*[1]	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Black Bullhead	170	45.8	56.7	±3.7	54.3	52	1	--
Common Carp	124	33.4	41.3	±8.4	25.5	65	3	--
Walleye	46	12.4	15.3	±2.4	11.8	83	3	92
Black Crappie	19	5.1	6.3	±2.3	9.6	44	0	111
Yellow Perch	7	1.9	2.3	±0.4	0.9	--	--	--
Bigmouth Buffalo	2	0.5	0.7	±0.9	0.0	--	--	--
Freshwater Drum	1	0.3	0.3	±0.4	0.0	--	--	--
Northern Pike	1	0.3	0.3	±0.4	0.5	--	--	--
Yellow Bullhead	1	0.3	0.3	±0.4	0.1	--	--	--

*10 years (2006-2015)

Table 6. CPUE by length category for selected species sampled with gill nets in Cavour Lake, Beadle County, August 5-6, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Black Bullhead	0.7	56.0	27.0	28.3	0.7	56.7	±3.7
Common Carp	20.7	20.7	7.3	12.7	0.7	41.3	±8.4
Walleye	2.0	13.3	2.3	10.7	0.3	15.3	±2.4
Black Crappie	0.3	6.0	3.3	2.7	--	6.3	±2.3
Yellow Perch	--	2.3	0.7	1.7	--	2.3	±0.4
Bigmouth Buffalo	--	0.7	0.7	--	--	0.7	±0.9
Freshwater Drum	--	0.3	--	0.3	--	0.3	±0.4
Northern Pike	--	0.3	--	0.3	--	0.3	±0.4
Yellow Bullhead	--	0.3	--	--	0.3	0.3	±0.4

Length categories can be found in Appendix A.

[1] See Appendix A for definitions of CPUE, PSD, RSD, RSD-P and mean Wr.

Table 7. Total catch from five overnight trap nets set in Cavour Lake, Beadle County, August 5-6, 2015.

Species	*#*	*%*	*CPUE*	*80% C.I.*	*Mean CPUE**	*PSD*	*RSD-P*	*Mean Wr*
Black Bullhead	1,287	88.3	257.4	±112.0	257.9	38	0	--
Black Crappie	89	6.1	17.8	±6.7	59.4	48	7	108
Common Carp	31	2.1	6.2	±2.8	9.2	65	45	--
Yellow Bullhead	26	1.8	5.2	±2.0	1.2	100	62	--
Northern Pike	8	0.5	1.6	±0.9	0.6	--	--	--
White Sucker	8	0.5	1.6	±1.0	0.6	--	--	--
Walleye	5	0.3	1.0	±1.0	1.8	--	--	--
Green Sunfish	2	0.1	0.4	±0.5	0.0	--	--	--
Hybrid Sunfish	1	0.1	0.2	±0.3	0.0	--	--	--
Yellow Perch	1	0.1	0.2	±0.3	0.3	--	--	--

*10 years (2006-2015)

Table 8. CPUE by length category for selected species sampled with trap nets in Cavour Lake, Beadle County, August 5-6, 2015.

Species	*Substock*	*Stock*	*S-Q*	*Q-P*	*P+*	*All sizes*	*80% C.I.*
Black Bullhead	10.2	247.2	154.4	92.8	--	257.4	±112.0
Black Crappie	0.4	17.4	9.0	7.2	1.2	17.8	±6.7
Common Carp	2.2	4.0	1.4	0.8	1.8	6.2	±2.8
Yellow Bullhead	--	5.2	--	2.0	3.2	5.2	±2.0
Northern Pike	--	1.6	0.2	1.0	0.4	1.6	±0.9
White Sucker	--	1.6	--	0.2	1.4	1.6	±1.0
Walleye	--	1.0	0.2	0.6	0.2	1.0	±1.0
Green Sunfish	--	0.4	0.4	--	--	0.4	±0.5
Hybrid Sunfish*	--	--	--	--	--	0.2	±0.3
Yellow Perch	--	0.2	--	--	0.2	0.2	±0.3

*No length categories established. Length categories can be found in Appendix A.

Table 9. Gill-net (GN) or trap-net (TN) CPUE for selected fish species sampled in Cavour Lake, 2006-2015.

Species	*Gear*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Black Bullhead	GN	16.0		3.3		33.7	67.3		30.7	172.7	56.7
	TN	129.8		120.0		30.7	679.5		342.0	245.8	257.4
Black Crappie	GN	1.5		6.7		34.3	16.3		0.3	2.0	6.3
	TN	23.4		52.4		199.8	83.5		20.2	18.4	17.8
Common Carp	GN	37.5		34.0		13.7	29.7		11.3	11.3	41.3
	TN	17.4		6.4		6.3	23.1		4.2	1.0	6.2
Northern Pike	GN	--		--		--	0.7		1.7	1.0	0.3
	TN	1.6		--		--	0.3		0.2	0.4	1.6
Walleye	GN	4.5		55.3		1.3	0.3		2.0	3.7	15.3
	TN	2.6		8.2		0.4	0.1		--	0.6	1.0
White Sucker	GN	--		--		--	0.3		0.7	--	--
	TN	--		--		--	0.9		0.8	0.8	1.6
Yellow Bullhead	GN	--		--		--	0.3		--	--	0.3
	TN	0.8		0.2		--	0.7		--	1.4	5.2
Yellow Perch	GN	--		--		--	0.3		2.3	1.7	2.3
	TN	0.2		0.6		0.3	0.5		--	0.2	0.2

Walleye

Management Objective

- maintain a walleye population with a total gill-net CPUE of at least 10

Management Strategy

- stock walleye fry at the rate of 500/acre (196,000) as needed to achieve the management objective

For the first time since 2008, walleye CPUE increased above the management objective (Table 10). The size structure of the current population has improved with the majority of fish ranging in length from 38-51 cm (15-20 in, Figure 2). A small number of sub-stock (>10 in) length fish were sampled, indicating some contribution due to stocking or natural reproduction.

Table 10. CPUE, PSD, RSD-P, and mean Wr for all walleyes sampled with gill nets in Cavour Lake, Beadle County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE	4.5		55.3		1.3	0.3		2.0	3.7	15.3
PSD	--		0		--	--		--	45	83
RSD-P	--		0		--	--		--	0	3
Mean Wr	--		87		--	--		--	98	92

Table 11. Walleyes stocked into Cavour Lake, Beadle County, 2006-2015.

Year	***Number***	***Size***
2007	23,180	Small Fingerling
2011	23,340	Small Fingerling
2012	46,400	Small Fingerling
2014	115,000	Fry
2015	27,920	Small Fingerling

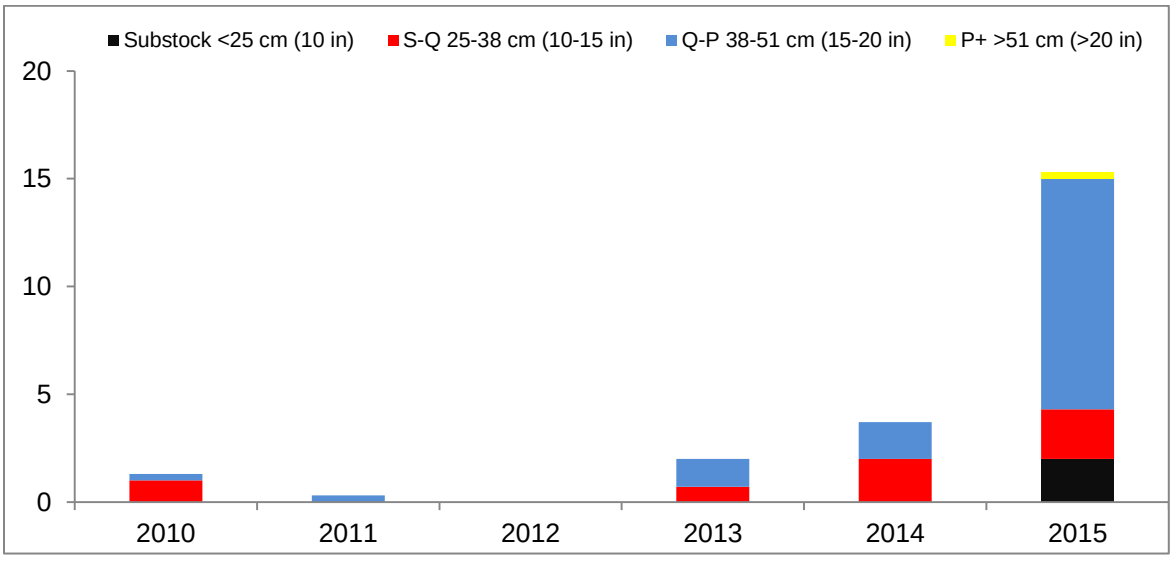

Figure 2. CPUE by length category for walleye sampled with gill nets in Cavour Lake, Beadle County, 2010-2015.

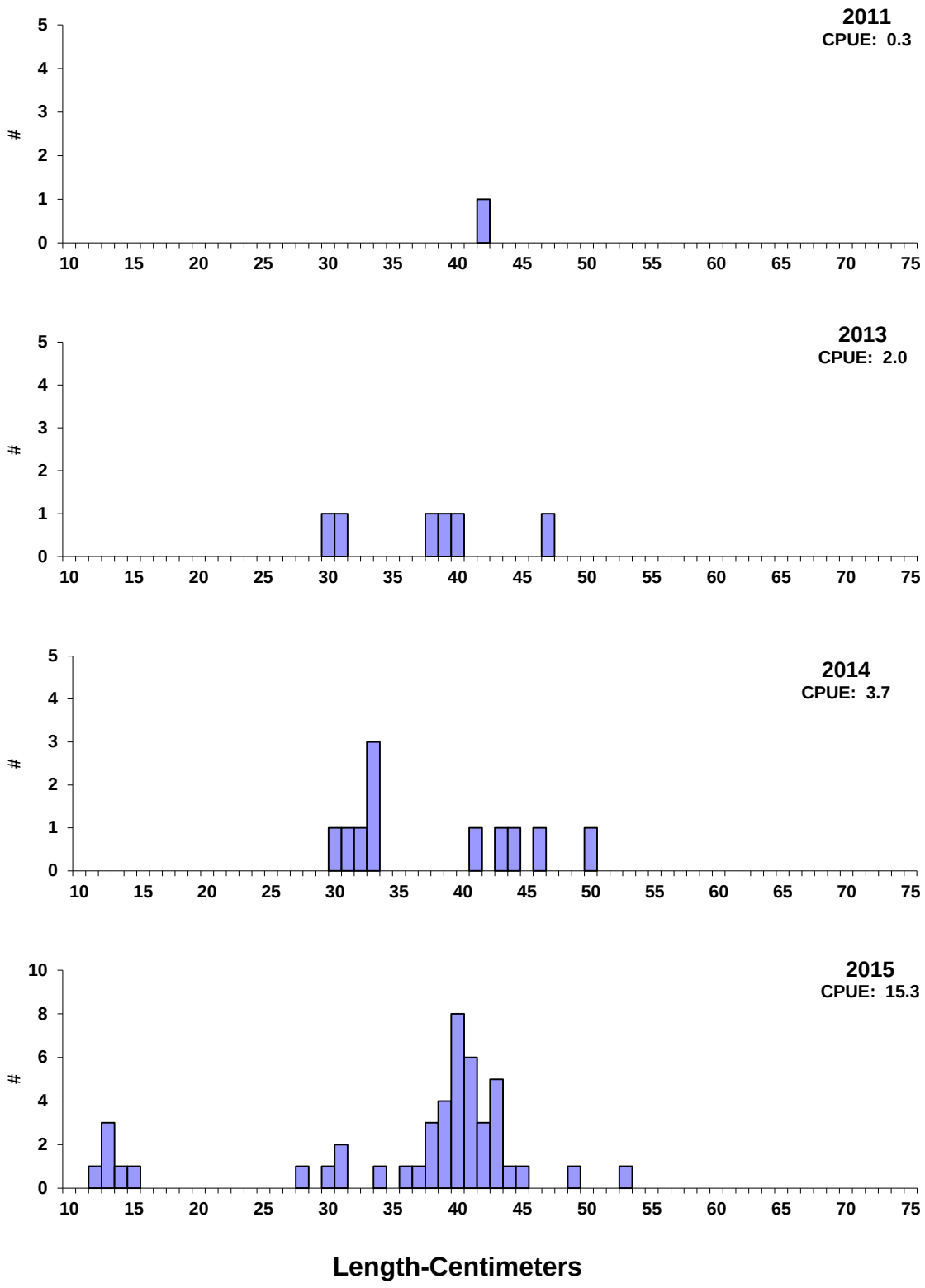

Figure 3. Length frequency histograms for walleyes sampled with gill nets in Cavour Lake, Beadle County, 2011, 2013, 2014, and 2015.

Black Crappie

Management Objective

- none

Management Strategy

- monitor the black crappie population during lake surveys and report the results

Black crappie abundance was similar to 2014, while population size indices were markedly lower (Table 12). Although it appears a small year class was naturally produced in 2013 (Figures 4, 5), an additional large year class is needed to substantially increase abundance and improve fishing opportunity.

Table 12. CPUE, PSD, RSD-P, and mean Wr for all black crappies sampled with trap nets in Cavour Lake, Beadle County, 2006-2015. Stocked years are shaded.

	2006	***2007***	***2008***	***2009***	***2010***	***2011***	***2012***	***2013***	***2014***	***2015***
CPUE	23.4		52.4		199.8	83.5		20.2	18.4	17.8
PSD	98		30		1	78		100	76	48
RSD-P	58		26		0	0		91	76	7
Mean Wr	98		118		95	100		92	127	108

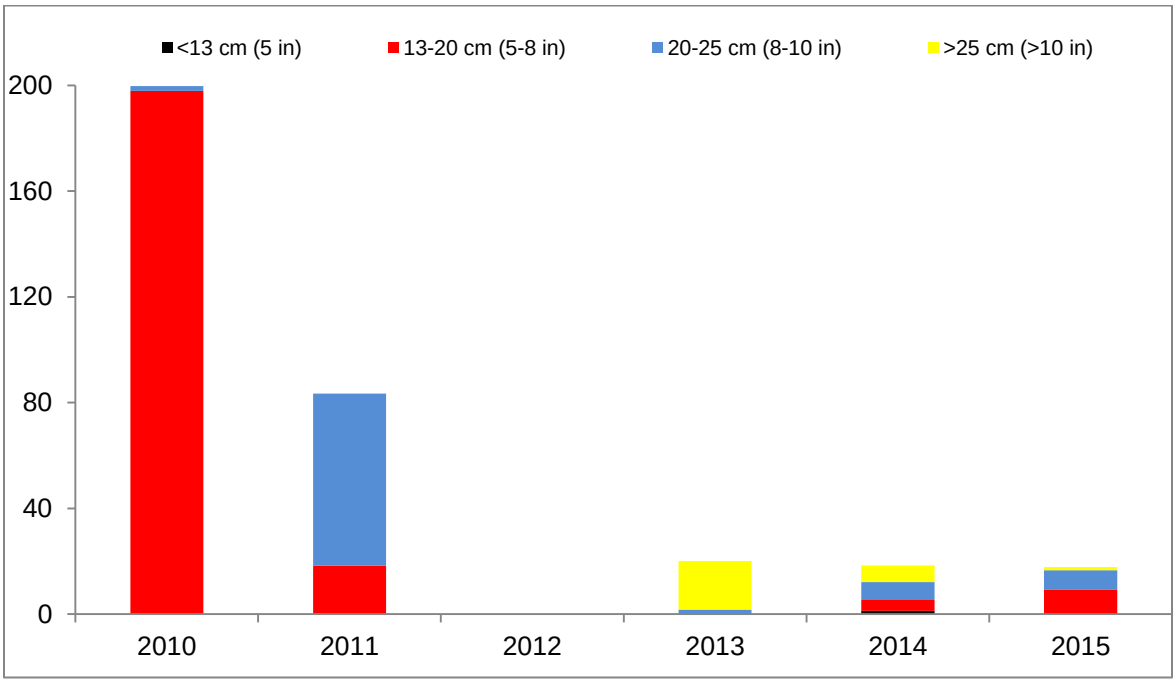

Figure 4. CPUE by length category for black crappies sampled with trap nets in Cavour Lake, Beadle County, 2010-2015.

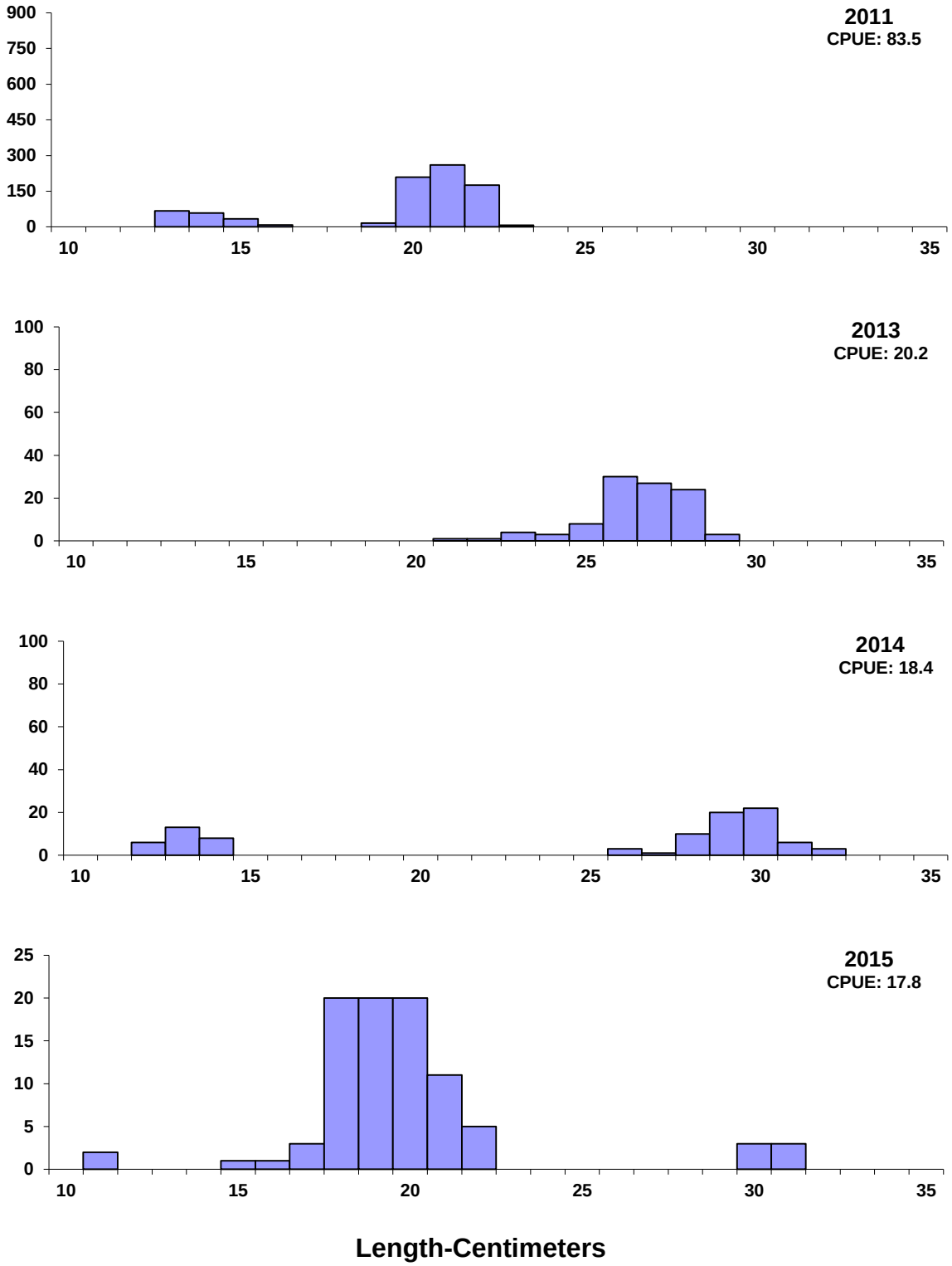

Figure 5. Length frequency histograms for black crappies sampled with trap nets in Cavour Lake, Beadle County, 2011, 2013, 2014 and 2015.

Appendix A. A brief explanation of catch per unit effort (CPUE), proportional stock density (PSD), relative stock density (RSD) and relative weight (Wr).

Catch Per Unit Effort (CPUE) is the catch of animals in numbers or in weight taken by a defined period of effort. Can refer to trap-net nights of effort, gill-net nights of effort, catch per hour of electrofishing, etc.

Proportional Stock Density (PSD) is calculated by the following formula:

$$PSD = \frac{\text{Number of fish} > \text{quality length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

Relative Stock Density (RSD-P) is calculated by the following formula:

$$RSD\text{-}P = \frac{\text{Number of fish} > \text{preferred length}}{\text{Number of fish} \geq \text{stock length}} \times 100$$

PSD and RSD-P are unitless and usually calculated to the nearest whole digit.

Size categories for selected species found in Region 3 lake surveys, in centimeters (inches in parenthesis).

Species	Stock	Quality	Preferred	Memorable	Trophy
Walleye	25 (10)	38 (15)	51 (20)	63 (25)	76 (30)
Yellow perch	13 (5)	20 (8)	25 (10)	30 (12)	38 (15)
Black crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
White crappie	13 (5)	20 (8)	25(10)	30 (12)	38 (15)
Bluegill	8 (3)	15 (6)	20 (8)	25 (10)	30 (12)
Largemouth bass	20 (8)	30 (12)	38 (15)	51 (20)	63 (25)
Smallmouth bass	18 (7)	28 (11)	35(14)	43 (17)	51 (20)
Northern pike	35 (14)	53 (21)	71 (28)	86 (34)	112 (44)
Channel catfish	28 (11)	41 (16)	61 (24)	71 (28)	91 (36)
Black bullhead	15 (6)	23 (9)	30 (12)	38 (15)	46 (18)
Common carp	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)
Bigmouth buffalo	28 (11)	41 (16)	53 (21)	66 (26)	84 (33)

For most fish, 30-60 or 40-70 are typical objective ranges for “balanced” populations. Values less than the objective range indicate a population dominated by small fish while values greater than the objective range indicate a population comprised mainly of large fish.

Relative weight (Wr) is a condition index that quantifies fish condition (i.e., how much does a fish weigh for its length). A Wr range of 90-100 is a typical objective for most fish species. When mean Wr values are well below 100 for a size group, problems may exist in food and feeding relationships. When mean Wr values are well above 100 for a size group, fish may not be making the best use of available prey.